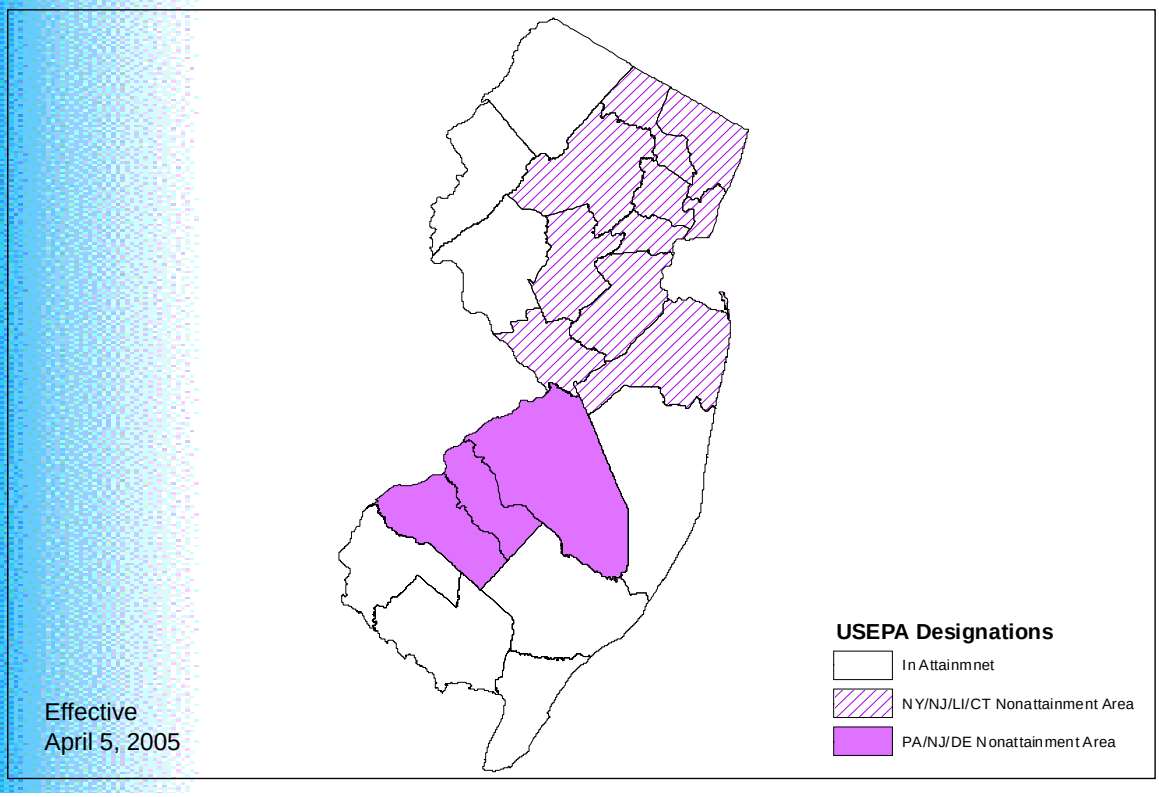
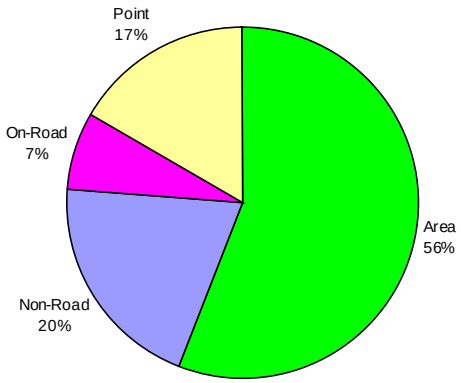
USEPA Designations of Nonattainment Areas for PM2.5 in New Jersey

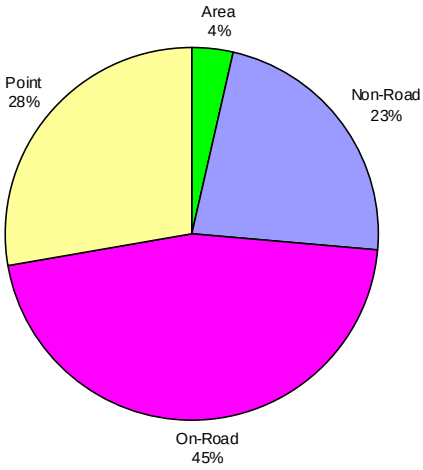


DRAFT 2002 New Jersey $PM_{2.5}$ Emissions by Sector



Total $PM_{2.5}$ Emissions - 29,103 tpy
(Includes Adjusted Fugitive Dust Emissions)

DRAFT 2002 New Jersey NO_x Emissions by Sector



Total No_x Emissions - 1,009 tpd
(Anthropogenic sources only)

DRAFT 2002 Statewide Emission Inventory by Source Sector and Pollutant

	Nox			PM2.5 *	
Source Sector	**Tons per Summer Day**	**Tons per Year**	**% of Total Annual Inventory**	**Tons per Year**	**% of Total Annual Inventory**
Point	280.36	52,121	16.41%	4,868	16.73%
Area	35.92	26,742	8.42%	16,269	55.90%
On-road	461.04	170,939 (62,529 from diesel)	53.82%	2,044 (1,365 from diesel)	7.02%
Non-road**	231.56	66,443 (45,509 from diesel)	20.92%	5,922 (3,584 from diesel)	20.35%
Biogenic	3.78	1,382	0.44%	0	0.00%
Total in State	1,012.66	317,627		29,103	

***** These totals include adjusted emissions from fugitive dust categories.
**Non road includes locomotive and marine.

Definitions of Source Sectors:
Point source: a stationary facility that emits or has the potential to emit at or above any of the following thresholds:

- 10 tons per year of VOC
- 25 tons per year of NO_x
- 100 tons per year of CO, $PM_{2.5}$, PM_{10}, SO_2, NH_3

The remaining stationary sources are included in the area sources emissions inventory.

Area sources: emissions from numerous facilities or activities that individually release small amounts of a given pollutant, but collectively they can release significant amounts of a pollutant. This includes small stationary sources that fall below required emission reporting thresholds by the Emission Statement Program. Area sources are small and numerous and have emissions which are not readily associated with a single point or a small set of points. Some of the stationary sources in this sector are sometimes referred to as minor point sources.

On-road sources: exhaust (i.e., tailpipe) emissions, fuel evaporative emissions, and brake/tire fugitive emissions from all vehicles (both gasoline and diesel-fueled) operating on New Jersey roadways.

Non-road sources: equipment or vehicles that are not commonly operated on a roadway except when used for roadway construction or repair. This category includes construction equipment, such as bulldozers; agricultural equipment such as combines; aircraft and related airport equipment; locomotives; and marine vessels.

Biogenic sources: Emissions produced by living organisms or biological processes, including emissions from plant matter as well as humans, domestic, animals and wild animals**.**

DRAFT - On-road sources of diesel PM 2.5

On-road sector	PM 2.5 (tons per year)	NOx (tons per year)
Light duty diesel cars	30	230
Light duty diesel trucks	6	66
Heavy duty diesel trucks (>8500 lbs)	1329	62,233
TOTAL	**1365**	**62,529**

DRAFT - Non-road sources of diesel PM 2.5

Non-road sector	PM 2.5 (tons per year)	NOx (tons per year)
Construction, agricultural, industrial, commercial	2674	28,813
Commercial Marine	782	10,981
Locomotive	127	5716
TOTAL	**3,584**	**45,510**

DRAFT 2002 Statewide *On-road* Source Emission Inventory

by County and Pollutant

County	PM 2.5 Tons per Year	Nox Tons per Year
Atlantic	53	5,347
Bergen	166	16,677
Burlington	158	11,325
Camden	137	9,796
Cape May	20	1,862
Cumberland	31	2,413
Essex	107	10,176
Gloucester	92	6,736
Hudson	66	5,807
Hunterdon	69	5,260
Mercer	116	8,277
Middlesex	250	21,002
Monmouth	142	12,447
Morris	141	12,589
Ocean	79	7,519
Passaic	71	6,216
Salem	39	2,730
Somerset	85	7,096
Sussex	42	2,803
Union	99	9,855
Warren	82	5,008
Total in State	**2,044**	**170,939**

***** These totals include adjusted emissions from fugitive dust categories.

DRAFT 2002 Statewide *Non-road* Source Emission Inventory by County and Pollutant

County	$PM_{2.5}$ Tons per Year	Diesel $PM_{2.5}$ tons per year	Nox Tons per Year	Diesel Nox tons per year
Atlantic	225	82	1,771	1078
Bergen	478	318	6,707	4117
Burlington	413	283	3,776	2744
Camden	228	178	2,669	1968
Cape May	468	109	1,959	1358
Cumberland	374	197	2,574	2053
Essex	393	287	8,137	3619
Gloucester	222	173	2,200	1804
Hudson	345	312	5,976	5280
Hunterdon	103	70	1,223	962
Mercer	203	148	2,427	1667
Middlesex	346	244	4,849	3212
Monmouth	501	252	4,316	3266
Morris	280	155	3,151	1764
Ocean	409	104	2,138	1341
Passaic	178	127	2,413	1491
Salem	122	78	932	777
Somerset	149	100	2,097	1393
Sussex	89	41	615	451
Union	333	286	5,883	4732
Warren	64	39	631	434
Total in State	**5,922**	**3,584**	**66,443**	**45,510**

EXPLANATION OF INVENTORY DEVELOPMENT FOR ON-ROAD AND NON-ROAD MOBILE SOURCES

I. On-road Sources

The onroad source component of the 2002 emission inventory is an estimate of exhaust (i.e., tailpipe) emissions, fuel evaporative emissions, and brake/tire fugitive emissions from all vehicles (both gasoline and diesel-fueled) operating on New Jersey roadways. In general, the emissions from this component of the emission inventory are calculated by multiplying an activity level by an emission factor. In the case of onroad mobile sources, the activity level is daily vehicle miles traveled (DVMT). The emission factors are calculated using the latest version of the USEPA MOBILE computer model.

A. Daily Vehicle Miles Traveled

The DVMT used in this emission inventory was calculated with the travel demand models (TDMs) used by the three Metropolitan Planning Organizations (MPOs) in the State. MPO's are charged with developing transportation plans and programs that promote the safe and efficient management, operation and development of transportation systems while minimizing fuel consumption and air pollution. The three MPOs with jurisdiction in New Jersey are the North Jersey Transportation Planning Authority (NJTPA), the Delaware Valley Regional Planning Commission (DVRPC) and the South Jersey Transportation Planning Organization (SJTPO).

In general, the TDMs use demographic data, such as population, employment, housing density, and shopping patterns, to estimate the demand for travel in the modeled area. This travel demand is then distributed throughout the available roadways and transit routes, referred to as links. The model is based on an algorithm which takes into account factors such as transit fares, tolls, traffic volume, and time of day to estimate how many people travel from one point to another on any given link. The number of vehicles traveling on each link is then used to estimate the speed of travel and the total number of vehicle miles traveled (VMT) in a day.

B. MOBILE Model and Model Inputs

The USEPA MOBILE computer model estimates vehicle emission factors for carbon monoxide; exhaust, brake and tire wear direct particulate matter; and ozone and particulate matter precursors.

The emission factors calculated by the MOBILE6 model are dependent on a variety of data, including temperature, humidity, distribution of travel speeds, fuel type, vehicle age distribution, type of inspection and maintenance (I/M) program and roadway type. The model is designed so that the user can input State-specific data for many of the variables that affect vehicle emissions. If State-specific data is unavailable, default values are also available for many of the inputs required for the model.

II. Non-road Sources

A. Non-road Equipment Emissions From NONROAD Model

Non-road equipment emissions for VOC, NO_x, CO, PM_{10}, $PM_{2.5}$ and SO_2 for the 2002 inventory were calculated using the NONROAD Emissions Equipment Model (NNEM), Version 2.3c (April 2004) developed by the USEPA for use by the states in estimating emissions from nonroad sources. The NNEM includes more than 80 basic and 260 specific types of non-road equipment, which are stratified by equipment types, horsepower rating and fuel. Fuel types include gasoline, diesel, compressed natural gas (CNG) and liquefied petroleum gas (LPG).

The NNEM contains default equipment population data. The default equipment population values were used except for the population of airport ground support equipment (GSE). An actual inventory of ground support equipment (GSE) for Newark Liberty International Airport (NLIA) was used, since it was available. Using this approach is believed to enhance the accuracy of the inventory since it is based upon an actual equipment count for the largest airport operation within the state.

The NNEM also contains default human population data, however, the NJDEP input state specific 2002 human population data for New Jersey. The human population data is the same as those used by the metropolitan planning organizations in their travel demand models to calculate on-road sector emissions. For certain SCCs, the NNEM uses human population as a factor in calculating equipment activity levels.

B. Aircraft Emissions

Aircraft emissions for VOC, NO_x, CO, PM_{10}, $PM_{2.5}$ and SO_2 were calculated based on the number of landing and take-off (LTO) cycles generated at each airport. The six major airports in New Jersey, Newark Liberty International, Teterboro, Atlantic City, Morris Municipal, Essex County and Mercer County, supplied the NJDEP with their aircraft fleet mix. These values were used as inputs to the Emissions and Dispersion Modeling System (EDMS), the Federal Aviation Agency (FAA) modeling tool.

C. Locomotive Emissions

Locomotive emissions for VOC, NO_x, CO, PM_{10}, $PM_{2.5}$ and SO_2 were calculated based on the estimated fuel consumption of individual railroad systems operating in New Jersey

D. Commercial Marine Vessel Emissions

Commercial Marine Vessel (CMV) emissions for VOC, NO_x, CO, PM_{10}, $PM_{2.5}$ and SO_2 for Northern New Jersey were taken from the CMV Emissions Inventory Report prepared

by Starcrest Consulting Croup, LLC.[1] This inventory was prepared as a part of the New York Harbor Deepening Project. This report relied on actual operational data, to the extent such information was available, and then used local activity parameters to extend emission estimates to those portions of the CMV not directly inventoried. Actual operational data was obtained from extensive interviews with vessel operators, crew, pilots and the United States Coast Guard's vessel traffic system that tracks oceangoing CMV from points of origin and destination. From this information emissions estimates were prepared based on estimated horsepower demand.

CMV emissions for the Southern New Jersey were estimated using fuel purchases for diesel and residual fuels and the number of trips of self propelled vessels along the Delaware River. Emissions on the Delaware River were split between Pennsylvania and New Jersey by assuming that all northbound emissions were in New Jersey and all southbound emissions were in Pennsylvania. This allocation process was agreed to by the two states as part of the 1990-emission inventory submittal.

[1] Starcrest Consulting Group, LLC, 2003, "The New York, Northern New Jersey, Long Island Nonattainment Area Commercial Marine Vessel Emissions Inventory"

DRAFT - On road sources of diesel PM 2.5 with indication as to whether they're affected by diesel legislation

On-road sector	PM 2.5 (tons per year)	NOx (tons per year)	Affected by Legislation?
Light duty diesel cars	30	230	No
Light duty diesel trucks	6	66	No
Heavy duty diesel trucks (>8500 lbs)	1329	62,233	Partially, as follows: 1. all school buses; 2. all transit buses; 3. garbage trucks that are publicly owned or used in public contract (2180 out of 2862*); 4. publicly owned other trucks such as dump trucks (1458 out of 133,400**)
TOTAL	**1365**	**62,529**	

*i.e., there are 2862 garbage trucks in NJ and 682 would not be affected by the legislation because they are privately owned and NOT used in a public contract.

**i.e., there are 133,400 heavy duty diesel trucks in NJ that are not school buses, transit buses or garbage trucks. Only 1458 of this total universe of 133,400 are affected by the legislation.

DRAFT - Non-road sources of diesel PM 2.5 with indication as to whether they're affected by diesel legislation

Non-road sector	PM 2.5 (tons per year)	NOx (tons per year)	Affected by legislation?
Construction, agricultural, industrial, commercial	2674	28,813	Only publicly owned construction equipment >100 horsepower. (This represents approx 680 out of 57,437 total pieces of construction equipment in the state.)
Commercial marine	782	10,981	No
Locomotive	127	5716	No
TOTAL	**3,584**	**45,510**	

REDUCTIONS ACHIEVED BY DIESEL RISK REDUCTION LEGISLATION

MEASURE	# of Vehicles targeted	REDUCTIONS (TONS PER YEAR)
Retrofits of school buses, publicly & privately owned [1]	16,470	11[2]
Retrofits of garbage trucks, publicly owned or privately owned and used in a public contract [1]	2,180 (out of 2862 in total universe)	14
Retrofits of NJ Transit buses [1]	1,993	20
Retrofits of privately owned transit buses [1]	7,588	70
Retrofits of publicly owned on-road and non-road vehicles [1]	2,138	15
Ultra-low sulfur diesel fuel for non-road vehicles	N/a	600 in the first year; 70 in each of the following three years
Compliance with idling regulations	N/a	200

[1]Only vehicles prior to Model Year 2007 would be affected.
[2]Reductions attributable to control of tailpipe emissions